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THE ROLE OF MILITARY STUDIES IN ENHANCING OUR UNDERSTANDING OF PTSD

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In this article we present recent studies that exemplify the role active duty military research can play in enhancing our current understanding of PTSD. At present, much of our research on PTSD has been conducted on war veterans and others who currently have the disorder. Such retrospective studies are limited in their ability to address questions regarding the etiology, development, and prevention of PTSD. Emerging military studies, however, provide both scientific and practical advantages in the study of acute stress and PTSD.

Of scientific interest, military personnel are a population that reports high rates of traumatic experiences. Active duty personnel tend to have higher pre-military rates of trauma compared to community samples. Thus, active duty populations afford researchers the opportunity to study individual differences in response to trauma. Additionally, military personnel often engage in dangerous and highly stressful activities in the course of their everyday duties. Because of their high risk for traumatic experiences, scientists are able to examine personnel prior to and following engagement in highly stressful or traumatic activities. Access to military populations thus provides scientists the opportunity to measure etiological factors and better understand the developmental course of PTSD.

Of practical concern, the at-risk nature of military service gives rise to a need for early detection and prevention efforts. The Department of Veterans Affairs currently spends an enormous amount of money yearly to treat PTSD. Research that identifies those likely to develop PTSD will allow for treatment interventions to take place prior to the development of a chronic symptom picture. Similarly, there is a need for research on the efficacy of preventive and acute interventions. Military studies have made contributions to knowledge in this area that can be applied to non-military populations as well.

It is not the intention of the authors to provide the reader with a comprehensive guide to military PTSD studies. Instead, we hope the reader will consider how some investigators have made use of *active duty* military populations in order to address pertinent questions in the field of trauma, and how one might build upon these examples by continuing to develop PTSD-relevant research with at-risk populations.

Pre-Military Trauma in Active Duty Populations. Recent publications have examined the rates of pre-military trauma and mental health among military personnel. Hourani and Yuan (1999) reported on the psychiatric diagnoses of a population-based, cluster sample of marines and sailors. In this multi-stage study, structured telephone interviews were used to evaluate the mental health status of 782 active duty men and women. Military women were almost two times more likely to experience a major depressive episode and five times more likely to have PTSD than men. Rape accounted for more than half of the cases of PTSD among women in this sample. Alternatively active duty men were more likely than women to have had a lifetime history of alcohol abuse and antisocial personality disorder. Importantly, only 19% of personnel meeting criteria for a disorder actually sought mental health care within the last year of the survey. Although women were more likely to seek treatment than men, these data suggest that the majority of active duty personnel do not seek help.

Studies have also focused upon child abuse and sexual assault among military populations. Stretch et al. (1998) demonstrated that women active duty soldiers report high rates of premilitary sexual traumas compared to men. In addition, Merrill et al. (1998) showed that high rates of pre-military sexual victimization was found among female U.S. Navy recruits. Of 1,832 female recruits surveyed in that study (mean age 20 years), 834 (45.5%) reported an attempted or completed rape. Rates of revictimization have also been explored in this population. In a more recent article, these same authors (Merrill et al., 1999) demonstrated that, similar to nonmilitary populations, navy recruits who were abused as children were at risk for adult sexual assault. Controlling for physical abuse, rates of adult rape were 4.8 times more likely among female re-

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cruits who had histories of child sexual abuse, relative to nonabused recruits.

Military populations have also been used to explore the role of early abuse upon factors such as cohesion and views of leadership. Rosen and Martin (1996), for example, assessed U.S. Army soldiers for experiences of childhood sexual abuse, physical abuse, and emotional neglect. They reported that only emotional neglect made a significant negative contribution to soldiers' ability to access social support within their units. Of course, different types of pre-military experiences may affect only some aspects of functioning during active duty. It remains to be seen which experiences will ultimately explain most of the variance in the development of stress-related illnesses such as PTSD.

Acute Stress During Active Duty Service. Active duty personnel who are deployed to the field or theatre of combat experience a complex mix of stressors in the course of their duties. These include interpersonal difficulties, lack of sleep, lack of food, physical exertion stress, and the demands of the environment (cold, heat, or altitude stress) in addition to difficult tactical duties. All of these factors may contribute to the degree to which an individual is capable of coping with trauma exposure. Morgan, Wang, Mason et al. (2000) demonstrated that soldiers engaged in rigorous training or in real-world tactical situations experience significantly compromised psycho-biological states. Military settings thus offer stress researchers the opportunity to evaluate the human response to acute, uncontrollable stress of a magnitude that cannot be replicated in a laboratory.

Several studies have provided robust evidence that the impact of military training stress can be enormous. Bernton et al. (1995) evaluated multiple neurobiological indices in military personnel during eight weeks of the Ranger Training Course. Courses such as this require leaders to perform in a combat-like environment under mental and physical stress approaching that found in combat. Profound reductions in weight (13%), testosterone (50%), cortisol, DHEA, and immune functioning were observed.

Prospective studies of military personnel have contributed to a better understanding of individual responses to stress, and potential vulnerability to stress-related disorders such as PTSD. Poe and colleagues (1970) evaluated psychological variables (defensive styles, personal histories) of Army recruits enrolled in Basic Training to determine whether defensive styles would predict neuroendocrine responses to training stress (as measured by urinary cortisol). They found that the effectiveness of a recruit's psychological defenses significantly predicted the degree of hypothalamic-pituitary-adrenal axis activation in response to the stress of basic training. These data provided powerful evidence that it was an individual's *perception* of stress that played a critical role in the adaptation to the stress of basic training. This study paved the way for a more lucid appreciation that subjective appraisal of traumatic stress is a significant determinant of post-stress sequelae.

A second prospective study, by Morgan, Wang, Southwick et al. (2000), tested whether certain biological abnormalities noted in individuals with PTSD might predate trauma exposure and the development of stress-related problems. Based upon research showing anti-arousal, anxiolytic properties of the 36 amino acid peptide, Neuropeptide-Y (NPY), Morgan et al. hypothesized that individuals may differ *prior* to trauma exposure in their capacity for NPY release. Furthermore, they postulated that such differences might contribute to significantly different responses to stress. These investigators evaluated NPY in soldiers prior to, during, and after exposure to an extremely stressful type of military training. NPY release during stress and 24 hours after stress were significantly and positively associated with both superior military performance and significantly fewer psychological symptoms of peritraumatic dissociation. Soldiers with less NPY release under stress (and who were depleted after stress exposure) experienced the greatest number of psychological symptoms of dissociation and the poorest objective performance. This research provides strong evidence that deficits in NPY capacity may predate trauma exposure and may place certain individuals at risk for the development of stress disorders.

Trauma During Active Duty Service. Because service personnel are at increased risk for trauma exposure, active duty populations are favorable subjects for longitudinal examination of trauma reactions. When traumatic situations arise, military units have large numbers of members exposed to the same trauma, thus providing uniformity of trauma exposure across people. Recent studies have taken advantage of these attributes by studying military populations over time. Wolfe and colleagues (1999) used a prospective design to examine rates of PTSD among those who served in the Persian Gulf War. Their findings showed that, among 2,949 Army personnel, rates of PTSD doubled over a period of approximately two years following combat. Use of a longitudinal design thus provided evidence for a delayed onset of PTSD symptoms that may increase over time.

Studies of military trauma have also made it apparent that combat is only one of many types of stressors that result in PTSD. For instance, during Operation Desert Storm, service members faced difficulties such as crowded, unsanitary conditions, threats of biological and chemical agents, and chemical contamination from a raging oil fire. Difficulties not limited to military settings, such as sexual harassment, were also problematic. Wolfe et al. (1998) documented trauma exposure in 160 Army women upon their return from the Gulf War and at 18-24 months post-deployment. They showed that sexual assault during deployment accounted for more PTSD symptoms than did other types of trauma, including combat exposure. The authors also provide data demonstrating the role that important intervening variables, such as leadership support, unit cohesion, and coping style, have upon symptoms.

Peacekeeping missions expose military personnel to some stressors that overlap with military service, such as being fired upon. Additionally, peacekeeping missions usually entail stressors unique to the peacekeeping environment, such as "restraint" of force and witnessing starvation. Litz et al. (1997) demonstrated that, among 3,461 active duty personnel, exposure to such stressors predicted PTSD symptoms five months following deployment. Fontana et al. (2000) provided another example of the interacting impact of combat exposure, contact with death, and sexual harassment upon 197 women and 1,307 men who served on peacekeeping missions. Again, greater contact with dying Somalians, exposure to combat, subjective fear, and sexual harassment all produced greater severity in PTSD symptoms for both male and female peacekeepers.

Because of dangerous tactical operations, another risk factor for many military populations is traumatic accidents, such as those resulting from fatal equipment mishaps and collisions. Service members may have traumatic reactions resulting from witnessing an accident, losing close buddies they would have liked to save, or participating in search and rescue efforts. Furthermore, certain military positions regularly expose workers to gruesome results of disasters. For example, U.S. Navy Occupational Divers were called to recover remains of 230 adult and child passengers who died in the 1996 TWA Flight 800 crash. In addition to the stress of recovering bodies amidst tense media coverage, divers faced hazards such as decompression sickness, hypothermia, and injury from debris at depths of 120 feet. Leffler and Dembert (1998) discuss how such groups are at risk for PTSD resulting from hazards unavoidable in dangerous occupations.

Recent studies have also longitudinally explored the role of emotional stability and psychological traits upon post-service PTSD symptoms. Bramsen and colleagues (2000) used a pre-post design to examine 572 Dutch Royal Army members during the United Nations mission to the former Yugoslavia. They demonstrated that, although exposure to traumatic events predicted PTSD, psychological traits measured by the Dutch MMPI prior to deployment also provide a unique contribution to symptomatology. In another study, Larsson and colleagues (2000) examined 510 volunteer Swedish battalion members recruited to serve for six months as NATO's Implementation Force in Bosnia. Their results indicated that

emotional stability, mental health, and sense of cohesion measured prior to departure predicted mental health following the mission. Ironically, exposure to traumatic events in Bosnia did not predict mental health in this sample.

Acute Intervention and Prevention. Naturally, the features of military service call for effective prevention and acute intervention efforts for at-risk active duty personnel. However, early research with military populations did not employ rigorous design methods needed to make solid conclusions. Interestingly, much early work has shown that traditional acute intervention efforts, such as psychological debriefing, did not reduce later rates of psychological difficulties in military personnel (e.g., Deahl et al., 1994). However, other research (e.g., Solomon & Benbenishty, 1986) suggested that front-line treatment for acute symptoms among soldiers with combat stress reactions was effective in preventing onset of PTSD. Additionally, Shalev et al. (1998) indicated that military debriefing positively impacted subjective anxiety, self-efficacy, and cohesion among Israeli soldiers exposed to combat. Unfortunately, control groups were not used in those studies.

Intervention studies that utilize more rigorous design methods are now emerging. Deahl et al. (2000) employed a randomized controlled design to study the impact of debriefing among British soldiers returning from peacekeeping duties in the former Yugoslavia. Soldiers in the debriefing group showed improvements on some PTSD measures but worse scores on others, compared to those who did not receive debriefing. Consistent with previous research, scores on non-PTSD measures improved in those who received debriefing. Clearly, soldiers benefit from the interventions. However, additional prospective studies are needed to identify the most efficacious treatments as well as those individuals most likely to benefit from intervention efforts.

Summary. Although brief, this overview illustrates the various opportunities offered by active duty military populations for the study of PTSD-relevant issues. We believe that detailed characterization of pre-military and active duty factors may significantly contribute to a better understanding of why and how individuals differentially respond to the circumstances of military service. Such an understanding is essential if we are to more clearly understand the etiology of stress symptomatology, the nature of traumatic events, and the factors that may ultimately prevent the development of PTSD.

SELECTED ABSTRACTS

BRAMSEN, I., DIRKZWAGER, A.J.E., & VAN DER PLOEG, H.M. (2000). **Predeployment personality traits and exposure to trauma as predictors of posttraumatic stress symptoms: A prospective study of former peacekeepers.** *American Journal of Psychiatry*, 157, 1115-1119. *Objective:* The authors' goal was to study the contribution of predeployment personality traits and exposure to traumatic events during deployment to the development of symptoms of PTSD in individuals involved in military peacekeeping activities. *Method:* 572 male veterans who participated in the United Nations Protection Force mission in the former Yugo-

slavia completed a short form of the Dutch MMPI before deployment. Following deployment, they participated in a survey of all Dutch military veterans who had been deployed in the years 1990-1995 and completed the Self-Rating Inventory for PTSD. *Results:* Exposure to traumatic events during deployment had the highest unique contribution to the prediction of PTSD symptom severity, followed by the personality traits of negativism and psychopathology, followed by age. *Conclusions:* Both pretrauma vulnerabilities and exposure to traumatic events were found to be important factors in the etiology of posttraumatic stress symp-

toms. The current study replicates in a non-American sample of peacekeepers findings obtained among American Vietnam veterans. Particularly, there is accumulating evidence for an etiological role of the personality trait of psychoneuroticism in the development of posttraumatic stress symptoms.

DEAHL, M.P., SRINIVASAN, M., JONES, N., THOMAS, J., NEBLETT, C., & JOLLY, A. (2000). **Preventing psychological trauma in soldiers: The role of operational stress training and psychological debriefing.** *British Journal of Medical Psychology*, 73, 77-85. Armed conflict is associated with significant long-term psychiatric morbidity. Interventions to reduce the incidence of psychiatric disorder following psychological trauma may be classified into three categories. Primary prevention includes the selection, preparation and training of individuals likely to be exposed to potentially traumatizing events. Secondary prevention comprises a variety of brief psychological techniques immediately or shortly after traumatizing life events, the best known of which is Psychological Debriefing. Tertiary interventions comprise the treatment of established PTSD and others. Psychiatric morbidity was studied in 106 British soldiers returning from UN peace-keeping duties in the former Republic of Yugoslavia. All 106 soldiers received an Operational Stress Training Package prior to their deployment and a randomly selected group also received a post-operational PD. Very low rates of PTSD and other psychopathology were found overall and the Operational Stress Training Package may have contributed to this. Elevated CAGE scores suggestive of significant alcohol misuse were observed in both groups and chemical avoidance behaviours arising from this may have masked psychopathology. CAGE scores diminished significantly in the debriefed group by the end of the follow-up period suggesting that PD may have been of benefit despite the apparent absence of PTSD. This study also demonstrates that a high incidence of psychiatric morbidity is not an inevitable consequence of military conflict.

DLUGOSZ, L.J., HOCTER, W.J., KAISER, K.S., KNOKE, J.D., HELLER, J.M., HAMID, N.A., REED, R.J., KENDLER, K.S., & GRAY, G.C. (1999). **Risk factors for mental disorder hospitalization after the Persian Gulf War: U.S. Armed Forces, June 1, 1991 - September 30, 1993.** *Journal of Clinical Epidemiology*, 52, 1267-1278. Effects of Persian Gulf War (August 2, 1990-July 31, 1991) and Gulf War occupation on post-War hospitalization risk were evaluated through Cox proportional hazards modeling. Active-duty men ($N = 1,775,236$) and women ($N = 209,760$) in the Army, Air Force, Navy, and Marine Corps had 30,539 initial postwar hospitalizations for mental disorders between June 1, 1991 and September 30, 1993. Principal diagnoses in the Defense Manpower Data Center hospitalization database were grouped into 10 categories of ICD-9-CM codes. Gulf War service was associated with significantly greater risk for acute reactions to stress and lower risk for personality disorders and adjustment reactions among men. Personnel who served in ground war support occupations (men and women) were at greater risk for postwar drug-related disorders. Men who served in ground war combat occupations were at higher risk for alcohol-related disorders. Longitudinal studies of health, hospitalization, and exposure beginning at recruitment, are needed to better understand how exposure to combat affects the mental health of military personnel.

FONTANA, A., LITZ, B.T., & ROSENHECK, R.A. (2000). **Impact of combat and sexual harassment on the severity of post-traumatic stress disorder among men and women peacekeepers in Somalia.** *Journal of Nervous and Mental Disease*, 188, 163-169.

The impact of combat and sexual harassment on the severity of PTSD is compared for 1,307 men and 197 women peacekeepers who served in the same military units. A theoretical model was proposed to express the nature of the impact. Structural equation modeling was used to evaluate the model separately for men and women. Good-fitting, parsimonious models were developed that showed substantial similarity for men and women. For men, severity of PTSD symptoms was impacted by exposure to combat directly and indirectly through fear and sexual harassment. For women, severity of PTSD symptoms was impacted by combat indirectly through the same two influences, although the mechanisms involving fear and sexual harassment were somewhat different. For both genders, moreover, PTSD severity was impacted directly by exposure to the dying of the Somali people. These similarities suggest that in modern stressful overseas military missions, both genders may be susceptible to the same types of risk for the development of PTSD. The incidence and impact of sexual harassment is particularly noteworthy in the case of men and calls for more detailed investigation in future studies.

HOURLANI, L.L. & YUAN, H. (1999). **The mental health status of women in the Navy and Marine Corps: preliminary findings from the perceptions of wellness and readiness assessment.** *Military Medicine*, 164, 174-181. The 1995 Perceptions of Wellness and Readiness Assessment was designed to provide baseline health and risk-factor information on the physical and mental health status of women in the U.S. Navy and Marine Corps and to make comparisons both within military subpopulations and with civilian populations. A population-based, multi-stage, cluster sample of 782 active duty Navy and Marine Corps women and men were administered a structured computerized telephone interview to make DSM-III-R psychiatric diagnoses. Estimates were 40% and 21% for overall lifetime and 1-year prevalence of psychiatric disorders, respectively. Women had about five times the risk of experiencing PTSD than men and about twice the risk of a major depressive episode. Of all personnel meeting diagnostic criteria for an active mental disorder, only 19% sought mental health care in the last year. Women generally sought treatment more readily than men.

LARSSON, G., MICHEL, P.-O., & LUNDIN, T. (2000). **Systematic assessment of mental health following various types of posttrauma support.** *Military Psychology*, 12, 121-135. In this study, we evaluated the influence of different forms of support (peer support, ventilation or defusing led by the ordinary group leader, and more formal debriefing sessions led by an external counselor) on mental health following traumatic experiences, using a prospective study design. The sample consisted of a Swedish battalion ($N = 510$), which was part of NATO's implementation force in Bosnia in 1996. Preservice assessment was made of personality, sense of coherence, and mental health. One third of the soldiers experienced traumatic situations during their service. Results showed that poor mental health after service was related more to preservice mental health and sense of coherence than to trauma exposure and posttrauma support. Peer support followed by a defusing session had a positive effect on postservice mental health, although this did not apply to the individuals with the worst preservice mental health. The value of formal debriefings could not be evaluated due to insufficient data.

LITZ, B.T., KING, L.A., KING, D.W., ORSILLO, S.M., FRIEDMAN, M.J. (1997). **Warriors as peacekeepers: Features of the Somalia experience and PTSD.** *Journal of Consulting and Clinical Psychology*, 65, 1001-1010. There has been scant empirical study of

the psychological consequences of contemporary peacekeeping missions. This study examined relationships among 4 variables characterizing this type of operation (traditional combat events, negative aspects of peacekeeping, pressure to uphold restraint, and positive aspects of peacekeeping) and symptoms of PTSD. Participants were 3,310 male and female soldiers who served in the 1992-1994 Somalia mission. Structural equation modeling procedures were applied to data from subsamples of non-African Americans and African Americans. For both groups, traditional combat and negative aspects of peacekeeping were associated with PTSD, frustration with restraint, and positive aspects of peacekeeping; however, restraint was not related to PTSD. Discrepancies between the groups involved relationships among the restraint, positive aspects, and PTSD variables. Recommendations are offered to foster inquiry into this new research.

MERRILL, L.L., NEWELL, C.E., MILNER, J.S., KOSS, M.P., HERVIG, L.K., GOLD, S.R., ROSSWORK, S.G., & THORNTON, S.R. (1998). **Prevalence of premilitary adult sexual victimization and aggression in a Navy recruit sample.** *Military Medicine*, 163, 209-212. U.S. Navy recruits ($N = 3,776$) were surveyed for premilitary histories of adult sexual assault. They completed a survey designed to estimate rates for experiences as victims (women) and perpetrators (men) of attempted and completed rape since the age of 14. The results show that 45.5% of the women reported being the victim of attempted (9.4%) or completed rape (36.1%) before entering the Navy. Male recruits' self-reports indicated that 14.8 percent admitted perpetrating attempted (3.5%) or completed rape (11.3%) before entering the Navy. A high percentage of recruits in this study reported histories of sexual assault. Female victims of sexual assault are at high risk of incurring somatic and/or psychological problems that require treatment by health care professionals. Male perpetrators of sexual assault are at high risk of repeating their behavior. The results of this study suggest that it may be cost-effective to develop treatment, education, and prevention programs for military recruits.

MORGAN, C.A., WANG, S., MASON, J.W., SOUTHWICK, S.M., FOX, P., HAZLETT, G., CHARNEY, D.S., & GREENFIELD, G. (2000). **Hormone profiles in humans experiencing military survival training.** *Biological Psychiatry*, 47, 891-901. *Background:* Clinical models of the human response to intense, acute stress have been limited to laboratory settings or cross sectional characterizations. As a result, data about the sensitivity of the human neuroendocrine activation to realistic stressors of varying magnitudes are limited. The U.S. Army survival course offers a unique opportunity to examine, in a controlled manner, the human response to acute, realistic, military stress. *Methods:* Salivary data were collected in 109 subjects at baseline during four stress exposure time points and at recovery. Serum data was collected at baseline and recovery in 72 subjects and at baseline and during stress exposure in a subgroup of subjects ($n = 21$). *Results:* Cortisol significantly increased during the captivity experience and was greatest after subjects' exposure to interrogations. Cortisol remained significantly elevated at recovery. Testosterone was significantly reduced within 12 hours of captivity. Reductions of both total and free T4 and of total and free T3 were observed, as were increases in thyrotropin. *Conclusions:* The stress of military survival training produced dramatic alterations in cortisol, percent free cortisol, testosterone, and thyroid indices. Different types of stressors had varying effects on the neuroendocrine indices. The degree of neuroendocrine changes observed may have significant implications for subsequent responses to stress.

MORGAN, C.A., WANG, S., SOUTHWICK, S.M., RASMUSSEN, A.M., HAZLETT, G., HAUGER, R.L., & CHARNEY, D.S. (2000). **Plasma neuropeptide-Y concentrations in humans exposed to military survival training.** *Biological Psychiatry*, 47, 902-909. *Background:* Neuropeptide-Y (NPY) is present in extensive neuronal systems of the brain and is present in high concentrations in cell bodies and terminals in the amygdala. Preclinical studies have shown that injections of NPY into the central nucleus of the amygdala function as a central anxiolytic and buffer against the effects of stress. The objective of this study was to assess plasma NPY immunoreactivity in healthy soldiers participating in high intensity military training at the U.S. Army survival school. The Army survival school provides a means of observing individuals under high levels of physical, environmental, and psychological stress, and consequently is considered a reasonable analogue to stress incurred as a result of war or other catastrophic experiences. *Methods:* Plasma levels of NPY were assessed at baseline (prior to initiation of training), and 24 hours after the conclusion of survival training in 49 subjects, and at baseline and during the Prisoner of War (P.O.W.) experience (immediately after exposure to a military interrogation) in 21 additional subjects. *Results:* Plasma NPY levels were significantly increased compared to baseline following interrogations and were significantly higher in Special Forces soldiers, compared to non-Special Forces soldiers. NPY elicited by interrogation stress was significantly correlated to the subjects' behavior during interrogations and tended to be negatively correlated to symptoms of reported dissociation. 24 hours after the conclusion of survival training, NPY had returned to baseline in Special Forces soldiers, but remained significantly lower than baseline values in non-Special Forces soldiers. NPY was positively correlated with both cortisol and behavioral performance under stress. NPY was negatively related to psychological symptoms of dissociation. *Conclusions:* These results provide evidence that uncontrollable stress significantly increases plasma NPY in humans, and when extended, produces a significant depletion of plasma NPY. Stress-induced alterations of plasma NPY were significantly different in Special Forces soldiers compared to non-Special Forces soldiers. These data support the idea that NPY may be involved in the enhanced stress resilience seen in humans.

POE, R.O., ROSE, R.M., & MASON, J.W. (1970). **Multiple determinants of 17-hydroxycorticosteroid excretion in recruits during basic training.** *Psychosomatic Medicine*, 32, 369-378. To define the effect of psychologic and other variables on 17-hydroxycorticosteroid excretion, a mean 17-OHCS level was obtained for each of 46 basic trainees, plus a rating of how effectively each was coping with psychologic stress, based on interviews and observations. Psychologic ratings and weight both correlated with 17-OHCS and together predicted 17-OHCS more accurately than did either alone. Several MMPI scales correlated with 17-OHCS; an analysis of differentiating items suggested that an effective defense, judged from 17-OHCS, is not defined by type of defense, nor solely on one's defensive ability, but as an interaction between one's usual modes of psychologic defense and the realities being defended against. 12 of 14 men with parental deaths were in the extreme 17-OHCS quartiles. When mean environment temperature fell, the group mean 17-OHCS rose, the men with more apparent body fat responding least. Results suggested that an individual's 17-OHCS level is influenced by psychologic, biologic, historic and environmental variables.

ROSEN, L.N. & MARTIN, L. (1996). **Impact of childhood abuse history on psychological symptoms among male and female soldiers in the U.S. Army.** *Child Abuse and Neglect*, 20, 1149-1160. The long-term psychological effects of 4 different types of childhood maltreatment were examined among 1,072 male and 305 female soldiers on active duty in the United States Army. The predictor variables included 4 subscales from the Childhood Trauma Questionnaire (CTQ): (1) physical-emotional abuse, (2) sexual abuse, (3) emotional neglect, and (4) physical neglect. An additional sexual abuse variable based on the 4 screening questions developed by Finkelhor, Hotaling, Lewis, and Smith was also included. Outcome was measured by the Brief Symptom Inventory and a dissociation scale developed by Briere and Runtz. MANOVAs were conducted for each outcome measure. Physical-emotional abuse contributed to most of the effects. However, sexual abuse contributed additional significant effects to all of the subscales. In general, males and females showed similar outcomes, but certain gender differences were noted.

SHALEV, A.Y., PERI, T., ROGEL-FUCHS, Y., URSANO, R.J., & MARLOWE, D.H. (1998). **Historical group debriefing after combat exposure.** *Military Medicine*, 163, 494-498. *Background:* Studies of group debriefing after extreme events have failed to show a significant long-term effect of this technique. However, the heterogeneity of the interventions studied and the length of time between debriefing and its assessment do not allow a proper interpretation of these findings. *Objective:* This study evaluates the immediate effect of debriefing in Israeli soldiers exposed to combat. *Method:* 6 small units ($N = 39$) have undergone historical group debriefing within 72 hours of exposure. State anxiety, self-efficacy, and combat evaluation were measured before and immediately after the sessions. *Results:* Debriefing was followed by reduction in anxiety, improvement in self-efficacy, and increased homogeneity of the group. *Conclusion:* These effects may be attributable to enhancing group cohesion or to a proper beneficial effect of debriefing.

STRETCH, R.H., DURAND, D.B., & KNUDSON, K.H. (1998). **Effects of premilitary and military trauma on the development of post-traumatic stress disorder symptoms in female and male active duty soldiers.** *Military Medicine*, 163, 466-470. We surveyed more than 1,000 female and male active duty soldiers to assess the effect of premilitary and military trauma on their psychological well-being. Questionnaire data were obtained on pertinent demographic information, history of trauma exposure, and symptoms of PTSD. The results indicated significant gender differences in the types of traumatic events experienced, with females reporting more sexual traumas and males reporting more non-

sexual traumas. In addition, males reported experiencing more military-related traumas, whereas females reported experiencing more premilitary traumas. The prevalence of PTSD symptoms was 8.6% for females and 5% for males. Recommendations are presented that may help mitigate development of PTSD symptoms in the future.

WOLFE, J., ERICKSON, D.J., SHARKANSKY, E.J., KING, D.W., & KING, L.A. (1999). **Course and predictors of posttraumatic stress disorder among Gulf War veterans: A prospective analysis.** *Journal of Clinical Psychiatry*, 67, 520-528. Rates and predictors of PTSD over time are not well understood. This study is the first to look at the rates of PTSD immediately following war and 2 years later using a large cohort ($N = 2,949$) of Gulf War veterans. Using a cut score to indicate presumptive PTSD, 3 percent of participants exceeded the cutoff at Time 1 compared with 8 percent at Time 2. Those who exceeded the cutpoint at Time 1 were up to 20 times more likely to exceed the cutpoint at Time 2 than those who did not exceed the cutpoint at Time 1. Women and those with high levels of combat exposure were at increased risk for PTSD at both times. Being young, being single, and having previous combat experience were associated with increased risk at Time 1 only, whereas reservists and enlisted personnel were at increased risk at Time 2 only. These findings indicate that, although low initially, rates of PTSD increased substantially over time.

WOLFE, J., SHARKANSKY, E.J., READ, J.P., DAWSON, R., MARTIN, J.A., & OUIMETTE, P.C. (1998). **Sexual harassment and assault as predictors of PTSD symptomatology among U.S. female Persian Gulf War military personnel.** *Journal of Interpersonal Violence*, 13, 40-57. Rates and sequelae of sexual harassment and assault among women in a wartime military sample were examined. A second goal was to explore the comparative impacts of these stressors and combat exposure on PTSD symptomatology. Army women ($N = 160$) were interviewed on return from the Persian Gulf War and again 18 to 24 months later. Rates of sexual assault (7.3%), physical sexual harassment (33.1%), and verbal sexual harassment (66.2%) were higher than those typically found in civilian and peacetime military samples. Sexual assault had a larger impact on PTSD symptomatology than combat exposure. Frequency of physical sexual harassment was significantly predictive of PTSD symptomatology. Furthermore, the number of postwar stressful life events mediated the relationship between physical sexual harassment and symptomatology but was not related to combat exposure. Sexual assault, sexual harassment, and combat exposure appear to be qualitatively different stressors for women, with different correlates and mechanisms of action.

ADDITIONAL CITATIONS

Annotated by the Editor

BARTONE, P.T. (1999). **Hardiness protects against war-related stress in Army reserve forces.** *Consulting Psychology Journal: Practice and Research*, 51, 72-82.

Examined hardiness as a predictor of psychiatric symptoms in 787 men and women who served on active duty in the Gulf War. Hardiness was associated with better outcomes and interacted with combat and life stress to buffer the adverse effects of these factors.

BERNTON, E., HOOVER, D., GALLOWAY, R., & POPPS, K. (1995). **Adaptation to chronic stress in military trainees. Adrenal androgens, testosterone, glucocorticoids, IGF-1, and immune function.** *Annals of the New York Academy of Sciences*, 774, 217-231.

Examined male soldiers who underwent an 8-week training program at the US Army Ranger School. The training, which involved metabolic as well as psychological stress, resulted in

numerous metabolic, cognitive, endocrinological, and immunological changes. Analyses focus on interrelationships among these changes.

BENOTSCH, E.G., BRAILEY, K., VASTERLING, J.J., UDDO, M., CONSTANS, J.I., & SUTKER, P.B. (2000). **War zone stress, personal and environmental resources, and PTSD symptoms in Gulf War veterans: A longitudinal perspective.** *Journal of Abnormal Psychology, 109*, 205-213.

Using a longitudinal design to examine personal and environmental resources as predictors of psychiatric symptoms in 348 Gulf War veterans and reservists who were measured, on average, 14 months after returning from the Gulf and then 13 months later. Avoidance coping and low family cohesion at time 1 predicted PTSD at time 2, and PTSD at time 1 predicted avoidance coping at time 2.

DEAHL, M.P., GILLHAM, A.B., THOMAS, J., SEARLE, M.M., & SRINIVASAN, M. (1994). **Psychological sequelae following the Gulf War: Factors associated with subsequent morbidity and the effectiveness of psychological debriefing.** *British Journal of Psychiatry, 165*, 60-65.

Studied 62 British soldiers who were assigned body-handling or -identification duties during the Gulf War. Prior experience handling dead bodies was associated with a lower likelihood of being a PTSD case. Debriefing was not associated with PTSD or other psychiatric symptoms.

ENGEL, C.C., ENGEL, A.L., CAMPBELL, S.J., MCFALL, M.E., RUSSO, J., & KATON, W. (1993). **Posttraumatic stress disorder symptoms and precombat sexual and physical abuse in Desert Storm veterans.** *Journal of Nervous and Mental Disease, 181*, 683-688.

Assessed 297 male and female treatment-seeking soldiers who served in the Gulf War. In women, precombat abuse was associated with a higher number of PTSD symptoms, whereas in men, precombat abuse was unrelated to PTSD symptoms.

FULLERTON, C.S., URSANO, R.J., VANCE, K., & WANG, L. (2000). **Debriefing following trauma.** *Psychiatric Quarterly, 71*, 259-276.

Conducted a longitudinal study of 254 medical care personnel who responded to an air-show disaster. Voluntary attendance at a debriefing session in the aftermath of the disaster was associated with female gender, prior disaster experience, higher exposure to the disaster, and high perceived social support.

LEFFLER, C.T. & DEMBERT, M.L. (1998). **Posttraumatic stress symptoms among U.S. Navy divers recovering TWA Flight 800.** *Journal of Nervous and Mental Disease, 186*, 574-577.

Studied 66 Navy divers who helped in recovery efforts following a large fatal airplane crash. These divers reported levels of PTSD symptoms that were comparable to levels reported by 59 Navy divers who did not take part in recovery efforts.

LITZ, B.T., ORSILLO, S.M., FRIEDMAN, M., EHLICH, P., & BATRES, A. (1997). **Posttraumatic stress disorder associated with peacekeeping duty in Somalia for U.S. military personnel.** *American Journal of Psychiatry, 154*, 178-184.

Surveyed 3,461 male and female active duty personnel approximately 5 months after they returned from serving as UN peacekeepers in Somalia. Eight percent met criteria for current PTSD. Predictors of PTSD symptoms were minority race, lower age, less

education, a greater amount of war-zone stressors, a perceived lack of generic reward from military service, and frustration with aspects of peacekeeping duty.

MARTIN, L., STRETCH, R.H., ROSEN, L.N., KNUDSON, K.H., & DURAND, D.B. (1998). **Prevalence and timing of sexual assaults in a sample of male and female U.S. Army soldiers.** *Military Medicine, 163*, 213-216.

Surveyed 555 male and 573 female soldiers. Almost 7% of men and 51% of women reported sexual assault; 23% of women reported a completed rape. Most of these assaults occurred prior to military service.

MERRILL, L.L., NEWELL, C.E., THOMSEN, C.J., GOLD, S.R., MILNER, J.S., KOSS, M.P., & ROSSWORK, S.G. (1999). **Childhood abuse and sexual revictimization in a female Navy recruit sample.** *Journal of Traumatic Stress, 12*, 211-225.

Examined the relationship between childhood abuse and adult rape in 1,887 female Navy recruits. Even after statistically controlling for the effects of childhood physical abuse, the authors found that women who experienced childhood sexual abuse were 4.8 times more likely than women who did not experience CSA to have been raped in adulthood.

RITCHIE, E.C., RUCK, D.C., & ANDERSON, M.W. (1994). **The 528th Combat Stress Control Unit in Somalia in support of Operation Restore Hope.** *Military Medicine, 159*, 372-376.

Describes experiences encountered during the first 90 days of deployment for a Combat Stress Control Unit deployed to Somalia during Operation Restore Hope. The stresses encountered by the Unit were of relatively low intensity, and infrequently involved service members traumatized by humanitarian aspects of their duty.

SHARKANSKY, E.J., KING, D.W., KING, L.A., WOLFE, J., ERICKSON, D.J., & STOKES, L.R. (2000). **Coping with Gulf War combat stress: Mediating and moderating effects.** *Journal of Abnormal Psychology, 109*, 188-197.

Studied predictors of coping with combat stress in 1,058 veterans and active duty personnel who were initially studied 5 days after returning from the Gulf War and then 18-24 months later.

SOLOMON, Z. & BENBENISHTY, R. (1986). **The role of proximity, immediacy, and expectancy in frontline treatment of combat stress reaction among Israelis in the Lebanon War.** *American Journal of Psychiatry, 143*, 613-617.

Examined how characteristics of frontline treatment were related to treatment outcome in Israeli soldiers who had experienced a combat stress reaction. Proximity, immediacy, and expectancy were associated with greater likelihood of returning to one's unit, and with lower likelihood of PTSD.

SOUTHWICK, S.M., MORGAN, C.A., DARNELL, A., BREMNER, D., NICHOLAOU, A.L., NAGY, L.M., & CHARNEY, D.S. (1995). **Trauma-related symptoms in veterans of Operation Desert Storm: A 2-year follow-up.** *American Journal of Psychiatry, 152*, 1150-1155.

Conducted a follow-up of 62 National Guard reservists 2 years after these men returned from the Gulf War. Although the sample was relatively healthy, PTSD symptoms increased over time. War-zone exposure was related to PTSD symptoms only at 2 year follow-up and not at prior assessments.

PILOTS UPDATE

We are pleased to announce the publication of the third edition of the *PILOTS Database User's Guide*, dated January 2001. This 188-page book will help researchers and clinicians to use the PILOTS database to find the information they need in the ever-growing traumatic stress literature.

As of 28 February 2001, the PILOTS database indexed 18,874 publications, and data on several hundred more are in process. This growth is not just a matter of numbers. The scope of the literature is expanding, too. This reflects new research into the causes, symptoms, and treatments of PTSD, as well as the lessons learned from the experience of clinicians worldwide. It also reflects an increasing number of social, political, legal, ethical, and religious viewpoints on traumatic stress.

As the nature of the traumatic stress literature changes, the PILOTS database is changing with it. We have revised our indexing vocabulary, adding almost three hundred terms to the PILOTS Thesaurus and modifying many others. We have begun to add hypertext links from PILOTS records to the full text of the publications they describe. And we are making the database easier to search on the World Wide Web. These changes are reflected in our new *User's Guide*.

The *PILOTS Database User's Guide* describes in detail the scope of the database, explaining what is included and what is excluded. It provides access and searching instructions for using the PILOTS database on the World Wide Web. (As part of the Dartmouth College Libraries' conversion of all online searching to the Web, the DCLOS text-only interface will be discontinued sometime during the next few months.) Both the Basic Search and Advanced Search interfaces are illustrated and described, as are options for sorting and displaying search results. Detailed descriptions of the data elements in PILOTS records, and the ways these can be used in searching for specific kinds of information, are provided.

The bulk of the new *User's Guide* is devoted to the newly revised PILOTS Thesaurus. A brief introduction

explains how we use it in assigning descriptors to the publications we index, and suggests ways of designing a search strategy that will find the materials you need among the thousands of publications indexed in the database. The various types of relationships among these terms is also explained, to help you choose the best terms to use in your searches.

In the "Systematic Table of PILOTS Descriptors," the 1100-odd PILOTS descriptors are arranged in the eight hierarchies on which we base our indexing. In these lists of terms—covering Stressors, Affected Persons, Effects, Assessment, Treatment, Scientific Research, Policy Issues, and Literary Formats—we use indentation to indicate increasingly narrower subdivisions. This makes it possible to find the appropriate descriptors to use in a search, even when you do not have a particular term in mind when you look at the Systematic Table.

The "Alphabetical Index to the PILOTS Thesaurus" occupies 146 pages of the *User's Guide*. This is a list of terms describing material that might be sought by a user of the PILOTS database. It includes not only the PILOTS descriptors but also a large number of other words and phrases that database users might have in mind. Its purpose is to indicate which of these terms should be used in searching the database, and to display the relationships between all of the terms listed.

A printed copy of the new *User's Guide* has been sent to each VA medical library and Vet Center. A facsimile of the entire *User's Guide* is available on our website as a PDF document, where it may be read or printed out. (The URL is <www.ncptsd.org/research/pilots/User's_Guide.pdf>.) The entire *User's Guide*, except for the alphabetical Index to the PILOTS Thesaurus, is available in Web format (at <www.ncptsd.org/research/pilots/Contents.html>). Because we will be able to revise the Web version of the database whenever it becomes necessary, we recommend that database users consult it on the Web. Users might wish to print out the PILOTS Database Quick Reference at <www.ncptsd.org/research/pilots/index.html>.

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